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ABSTRACT

A study investigated where preservice teachers are in their own ability to construct meaning from complex texts and how this is influenced by their views of knowledge. Subjects were 65 elementary education majors, 82 secondary education majors, and 23 physical education majors enrolled in five sections of a reading in the content areas course and one section of a curriculum and evaluation course. Subjects completed an epistemological questionnaire, a written conclusion task, and were interviewed two weeks after the written conclusion task. Results indicated no statistically significant differences between students who view knowledge in a more naive or a less naive manner and their ability to write simple versus complex conclusions nor in their ability to write certain versus uncertain conclusions. Analysis of the qualitative data, however, suggested a relationship. Results also indicated statistically significant differences in means between the elementary education, secondary education, and physical education majors for the "seek single answers," "avoid integration," and "learning is quick" scales. Findings suggest concern about the ability of the more "naive" thinkers in teacher education programs to teach and model the complex learning processes that are being expected of K-12 students. (Contains eight references, one table, and one figure of data.) (RS)

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The Relationship Between Preservice Teachers' Belief About the Nature of Knowledge and Their Ability to Construct Meaning From Text

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Background

There are increasing calls for K-12 students to demonstrate a degree of complexity in learning that has heretofore not been commonly demonstrated. For instance, the National Governors' Association (Cohen, 1987) suggests that "we need students who have the ability to communicate complex ideas, analyze and solve complex problems, identify order and find direction in ambiguous environments." Print media is certainly one of these complex areas. Research in the area of reading education reveals that students can be taught to approach reading from a more constructivist point of view -- to be more "strategic" in their reading (Cross and Paris, 1988; Duffy, Roehler and Herrmann, 1988; Palincsar and Brown, 1984). If educators are to model these behaviors for students, it is important to ask where preservice teachers are in their own ability to construct meaning from complex texts and how this is influenced by their views of knowledge. The research to be presented in this paper will focus on preservice teachers' beliefs about the nature of knowledge and the relationship between these beliefs and their ability to construct meaning from complex texts.

Previous research on undergraduates' concepts and structures of knowledge has found failure of preservice teachers to have coherent, integrated knowledge structures, (Herrmann, 1990); preservice teachers' conceptual levels have a bearing not only on their own reading comprehension, but also on their ability to model reading comprehension strategies for students (Ehlinger and Schenkat, 1990); and general education students' "epistemological beliefs seem to affect [their] processing of information and monitoring of their comprehension" (Schommer, 1990).

Although research data suggests a relationship between preservice teachers' levels of cognitive development and their ability to teach cognitive processes to students, the instrumentation used to determine their levels of cognitive development has proved to be limited in its ability to discriminate among subjects (Ehlinger and Schenkat, 1990). Schommer (1990) developed and validated the Epistemological Questionnaire which looks more precisely at this broad concept of conceptual levels and offers a more rigorous and reliable approach for this type of data collection.

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This study was designed to address the following questions:

1. Is there a relationship between preservice teachers' beliefs about the nature of knowledge and their ability to construct meaning from complex text?

2. Due to a hypothesized belief that preservice teachers with content majors perceive their content domains in a more complex fashion, is there a difference between secondary content majors and elementary education majors in their beliefs about knowledge?

Methodology

Subjects

This study partially replicates Schommers' (1990) work using upper-level (junior and senor) teacher education majors enrolled during the 1991-93 academic years in five sections of a reading in the content areas course and one section of a curriculum and evaluation course. Ninety-five percent of the students enrolled in these courses agreed to participate in the study, for a total of 65 elementary education majors, 82 secondary education majors (with a variety of majors), and 23 physical education majors (N = 170).

Materials

The materials for this study consisted of :

1) an Epistemological Questionnaire (Schommer, 1990) comprised of 63 items that assess five epistemological dimensions. An example of each is given. a) simple knowledge (Most words have one clear meaning), b) certain knowledge (Scientists can ultimately get to the truth), c) omniscient authority (People who challenge authority are over-confident), d) innate ability (Self help books are not much help), and e) quick learning (Successful students learn things quickly.)

2) a written conclusion task that involved writing a final paragraph drawn from a college psychology text chapter on aggression that contained competing points of view (Schommer, 1990).

3) retrospective interviews conducted with two weeks of the written conclusion task.

Procedures

Each student was asked to complete the Epistemological Questionnaire to determine epistemological dimensions. Means were computed for each student for each scale (Scales are listed in Table 1). The students' individual means for each scale were computed so that 1 = least naive about the nature of knowledge and 5 = most naive. In addition, information was obtained on each student's year in school, gender, major(s)/minor(s), special licensure (such as coaching certification) being sought, current GPA's, highest level of education of the mother and father, and PPST (Pre-Professional Skills Test) scores for reading, writing, and mathematics.

Two class sections (N= 64) were also given the chapter on aggression to read and asked to complete a) a confidence rating form to indicate the difficulty in reading the passage, b) a prior knowledge assessment, c) a self report on strategies used, and d) a written conclusion for the chapter. A filler task was used to control for variation in completion times. From these two classes, 20 students (31%) were randomly selected for retrospective interviews. The purpose of the interviews was to gain further insight into how these preservice teachers construct knowledge, by having them describe how they went about writing the conclusion for the text passage, focusing on thought processes and strategies used.

Data Analysis

Data consisted of scores on the Epistemological Questionnaire, coded written conclusion, and coded retrospective interviews.

To answer question 1, written conclusions were coded for certainty of knowledge and simplicity of thought on a dichotomous scale with an interrater reliability of 95%. (See figure 1.) One-way ANOVAS were computed to identify any significant differences that may exist between

more and less naive students and their ability to write complex conclusions. Interview data were first coded for strategies and thinking processes used and were next analyzed qualitatively to determine if other categories would emerge. These data were then compared to scores on the Epistemological Questionnaire to determine relationships between preservice teachers knowledge beliefs and their ability to construct meaning from text.

Question 2 was investigated using repeated measure ANOVA with the 12 scales as the repeated measures and the elementary /secondary /physical education distinction as the independent variable.

Results and Implications

Results are discussed in terms of the two research questions:

Question 1: Analysis of the statistical data derived from questionnaire mean scores and coding of summaries indicated that there were no significant differences between students who view knowledge in a more naive or a less naive manner and their ability to write simple vs. complex conclusions nor in their ability to write certain vs. uncertain conclusions. Analysis of the qualitative data based on retrospective interviews, however, suggested a relationship. When asked, "Tell me how you came up with this conclusion?," those with a less naive view of knowledge tended to go beyond the text by bringing in prior knowledge, and by being more metacognitive in their thinking. For example:

> *I kind of thought about , am I saying the important things? Am I adding too much detail? I also wanted to make sure as I started, to add in at the end some things that were kind of -- they weren't said in the passage. They were implied, but they weren't said... I was thinking about what I was thinking as I was writing it.(168)*

> *I reread through the material and then I picked important points -- what was basically being said. I drew from those points. I tried to think, did [it] follow what the article had been about? Did it make sense as I was writing it? Did it flow? Did it reach a conclusion? come to conclusions. (151)*

> *... I wanted to not repeat what the introduction had said, but try and draw -- challenge the students to maybe think a little bit more about how they personally feel about aggression. Draw conclusions that way instead of just reiterating everything that was said in the passage. (117)*

On the other hand, those who viewed knowledge in a more naive manner tended to stay just with the structure of the text and reiterate what the author said. For example:

> *I guess I looked at the structure, you'd say. First I read through here. Then I looked how it pointed to the three different types and gave a brief overview of them. So then I put a little bit of that in. I said that there were three, and then I talked about each one --just a sentence -- one had two sentences about it... (165)*

When asked, "Let's say you're my teacher. How would you teach me to write a conclusion?," both the less naive and the more naive students talked about how they would teach various "steps" in the summary process.

> *The first thing I would do is have them look over the article to kind of get a feel for how it was*

set up. Then I would have them read the whole thing. Then after that I would actually, while they were reading it, I would have them take a few notes on some of the important things. Then after they were done, I would have them read over their notes and then write a conclusion from that. (126)

Students with a less naive view of knowledge, however, more readily talked about other aspects of summary writing that they would teach, such as weeding out important from unimportant details, keeping an open mind and thinking beyond what is written, and writing from a specific point of view.

...I would probably teach you how to find those [main points] and the supporting details. You know, how to weed through the unimportant -- read through and find the important information that's in there. (168)

I would ask you to draw your own conclusion based on what you read. Trying not to say anything was right or wrong about what you read. You may have an opinion, but try and keep and open m;mind when you write this conclusion. Everything you have read is probably credible, and it has been researched [ ], or any other things. Just try and make like a summary and think a little bit more beyond what was actually written there. But not just to reiterate what was put in there or to form any opinions...Just to kind of think more instead of just accepting what's written there. Just really think it out and kind of make it clear for themselves. (117)

Well, it depends on what, I guess on what viewpoint you are coming from. You need to -- you could've, the conclusion of this could've come from any viewpoint. You need to, I think give the students a viewpoint, a certain viewpoint. I don't know which one you would want to go with, but you need to tell them... (135)

The more naive students appeared to have less sense of meaning making when writing their conclusions. All students reported following "steps" in summary writing, but the students who viewed knowledge in a less naive manner also went beyond the "steps" to more involved meaning making. Perhaps these preservice teachers need to be supported in understanding that teaching is not a black and white endeavor. These results also bring up the question of whether or not preservice teachers with a more naive view of knowledge have the ability to model complex abilities that are need by students today and into the future

Question 2: In answer to question 2, statistically significant differences in means between the elementary education, secondary education, and physical education majors were found for the Seek Single Answers, Avoid Integration, and Learning is Quick scales. (See Table 1.) These results lead one to speculated on whether a content major may give a learner a more sophisticated epistemology than an elementary education major. The questions also arise whether this is a pedagogical problem of general education or teacher education, and what can a reading methods class do to change epistemologies of undergraduates if these have already been developed through general education classes?

These results contribute to an ever growing body of research on preservice teachers' beliefs about the nature of knowledge and shed additional light on the relationship between one's beliefs about knowledge and the ability to construct meaning from text. These results lead one be concerned about the ability of the more "naive" thinkers in our teacher education programs to teach and model the complex learning process that are being expected for K-12 students.

Table 1

Means and standard deviations for epistemological scales by elementary, secondary, and physical education

Epistemological Scales	Elementary n = 42	Secondary n = 51	Physical Education n = 14	p value *
Seek Single Answers	2.92 (.348)	2.74 (.393)	3.05 (.251)	007 *
Avoid Integration	2.33 (.445)	2.25 (.401)	2.59 (.357)	025 *
Learning is Quick	1.83 (.421)	2.01 (.525)	2.30 (.475)	007 *
Learn it First Time	2.11	2.08	2.19	850
Can't Learn How to Learn	1.83	1.87	1.77	718
Success Does Not Equal Hard Work	1.95	1.99	2.26	183
Ability to Learn is Innate	2.33	2.50	2.59	260
Don't Criticize Authority	2.06	1.95	2.13	216
Depend on Authority	3.01	2.86	3.05	344
Knowledge is Certain	2.63	2.49	2.55	430
Effort is Waste of Time	2.36	2.47	2.46	728
Avoid Ambiguity	2.93	2.82	3.24	068

* *indicates significance*

Figure 1

Simplicity and Certainty in Passage Conclusions

Simplicity

Simple Conclusion - Student oversimplified text information by describing a single point of view or avoiding drawing a conclusion.

Complex Conclusion - Student elaborated on text information or showed integration of key points.

Certainty

Certain Conclusion - Student's conclusion was that people have the answer or will have the answer in the future.

Uncertain Conclusion - Student suggested uncertainty now or in the future.

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